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SOURCE Kraftfahrzeugtechnik, Vol 1, No 6, 1951, pp 143-144.THE STEUDEL RING ENGINE

The output of an internal-combustion engine depends, among other criteria, on effective piston area, mean operating pressure in the cylinder, and mean piston velocity. Displacement, by itself, is not of immediate importance. The smaller the stroke, with a given displacement, the greater the effective piston area and engine output. Practically, a certain bore-to-stroke ratio cannot be exceeded. Thus, the only possibility is dividing the total displacement among a maximum number of individual cylinders.

In practice, this idea has been utilized to a limited extent. However, with the known engine designs, this division has not been carried very far, having reached 12 cylinders for in-line and V-engines, and 11 cylinders for radial engines. In the case of the latter, furthermore, the chief components are concentrated in a small space and complicate production, accessibility and maintenance.

If one liter displacement, the basic conditions remaining equal, is subdivided into eight units, the output will be twice that of one cylinder of one-liter displacement, while, with 37 cylinders, the output will be tripled, and with 64 cylinders, it will be quadrupled. This shows the perspectives of economical use of the multicylinder design.

Construction of Engine

Six cylinders with two opposed pistons each are arranged around a central shaft with their six crankshafts. A central wheel (central shaft) is driven by six planetary wheels (crankshafts), with a reduction gear ratio of 1:2 to 1:6, depending on requirements. The entire engine block, consisting of one, two, or more such rings arranged in rows, has simple standard parts and allows easy maintenance. The large number of components of the same kind cuts down the number of parts to about 50, not counting standard parts such as screw, etc.

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Main Features of Design

1. Each individual engine (ring) is a closed system with balanced operating pressures.
2. In spark-ignition operations the mixture is sucked in and precompressed in the crankcase of only one cylinder per pair, according to the two-stroke cycle system; the combustion air is treated analogously in diesel engines. This affords good scavenging of the cylinders.
3. The ignition, or injection, takes place cyclically, continuously from ring to ring. Thus, in a 36-cylinder engine, one revolution of the crankshaft has 36 successive cycle strokes. This causes smooth, balanced running of the engine, similar to the running qualities of a turbine.
4. The piston velocity is very low, about 5.3 to 6.7 m/sec, so that the engine has a good thermal efficiency.
5. The weight of the engine, depending on the number of cylinders, is 2-3 kg/hp.

The Steudel ring engine is suitable for all purposes, such as road vehicles of all kinds, diesel-electric locomotives, and as a propulsion unit for ships and aircraft.

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